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A new technique for redo operation after failed endoanal pull-through procedure for correction of Hirschsprung's disease

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ABSTRACT

A new technique for performing redo operations after transanal endorectal pullthrough in cases of complicated Hirschsprung's disease is presented. Three patients were operated on. At laparotomy, the left colic artery and vein were ligated and sectioned, and the communicating vascular arcade to the medium colic vessels was maintained. For resection of the left colon, all vessel ligations were performed very close to the colon wall to preserve the trunk and most distal branch of the inferior mesenteric vessels. A pouch of the distal previously pulled through colon was vascularized by the preserved branch of the inferior mesenteric vessels. A pull-through of a portion of the colon with an external normal appearance was performed behind the pouch according to Duhamel technique. The anastomosis between the pulled-through colon and the anus was not primarily performed, and a perineal stump of 3–4 cm of exteriorized colon was left to avoid any contamination to the peritoneal cavity. After 3 weeks, this stump was excised. All of the patients had an uneventful recovery with normal fecal continence. This is a new effective technique to be used for redo operation after failed endoanal pull-through procedure.

Transanal endorectal pull-through (TEPT), proposed by De La Torre-Mondragon in 1998, has drastically changed the treatment of Hirschsprung's disease (HD) [1]. This minimally invasive procedure is considered to be the treatment of choice for the correction of HD in a high number of pediatric surgical centers. The majority of patients achieve good results with this technique, although 10–20% of patients suffer from recurrent intestinal constipation and serious episodes of enterocolitis of varying duration [2,3]. Appropriate management of these complications depends on the etiology of the problem and typically includes nonoperative approaches such as rectal irrigations, laxatives or behavioral modifications. In rare instances, particularly in cases of a persistent distal colon segment without any ganglion cells, these maneuvers fail and repeated pull-through surgery must be considered [4–12].

Few reports review the technical problems that may be encountered in performing a redo operation after TEPT operation. The most important potential problem is obtaining sufficient vascularization of the distal segment of colon mobilized to the pelvis and anastomosed to the anal canal. Another significant problem arises in the dissection and resection of the colon in the pelvis, until its distal portion can be anastomosed to the anal canal. This report presents a new simple technique, which advantageously requires minimal colon dissection in the pelvis, to be used in performing redo operation after TEPT in cases of complicated Hirschsprung's disease.

1. Case report

The cases are summarized in Table 1. Two patients underwent initial endoanal procedure at our institution (patients 1 and 3), while patient 2 underwent surgery at another institution. All initial procedures were performed according to the initial publication of Mondragon et al. [1]. All of the patients presented with classical Hirschsprung's disease with the transition zone at the rectosigmoid

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Table 1
Characteristics of the patients.

Patient number (gender)	Age at diagnosis	Age at original endoanal pull-through	Transition zone	Age at redo operation
1 (male)	Newborn	1 month	Rectosigmoid	2 years
2 (male)	Newborn	1 year	Descending colon	2 years
3 (female)	Newborn	1 month	Rectosigmoid	1 year 3 months

junction or at the descending colon. No patient underwent a diverting colostomy prior to or after the pull-through procedures.

After the TEPT procedure, all of the patients presented with severe symptoms of intestinal constipation, repeated fecaloma formation and abdominal distention. The duration of symptoms varied from 6 months to 1 year. Patients underwent contrast enemas that demonstrated atonic distal colon due to chronic distension and no radiological evidence of a persistent hypertensive internal sphincter. In addition, rectal suction biopsies were histochemically stained for the study of acetylcholinesterase (AChE) activity. In patient 2, AChE activity was clearly demonstrated, and the diagnosis of persistence of a distal aganglionic segment was confirmed. In cases 1 and 3, AChE activity was absent. All of the re-operations were performed or supervised by the surgeon MMS.

All of the patients were treated according to a previously used protocol involving a preoperative mechanical colon preparation involving anal irrigations and parenteral antibiotics (metronidazole, amikacin and ampicillin) initiated two days before the operation. A classical pull-through of the left colon segment was performed according to a modified Duhamel technique. At laparotomy, it was noted that only delicate adhesions were present in the abdominal cavity. The distal colon was dilated in the pelvis with no externally identified transition zone, and a normal appearance of the proximal colon was noted in all cases. The left colon was dissected from the left parietal gutter, with identification of the inferior mesenteric vessels and all the blood irrigation of the left colon. The left colic artery and vein were ligated and sectioned with special care taken to maintain the communicating vascular arcade to the medium colic vessels. It was thus possible to perform a complete mobilization of the left angle of the colon down to the pelvis. Following this step, the dilated left colon was resected, ligating the vessels very close to the colon wall to preserve the trunk and most distal branch of the inferior mesenteric vessels (Fig. 1). Finally, the colon was distally sectioned, preserving a 12–15 cm distal pouch vascularized by the preserved branch of the inferior mesenteric vessels, to perform minimal dissection of the colon in the pelvis. This pouch was closed with two layers of 3–0 prolene interrupted sutures. A pull-through of externally normal appearance colon was performed according to the classical Duhamel technique, behind and at the left side of the pouch. Although a distal colonic aganglionic segment is maintained as a reservoir, there are several evidences that this technique has good long-term results [13,14].

However, different from the classical Duhamel procedure, the anastomosis between the pulled-through colon and the anus was not primarily performed, nor was sectioned the septum formed by the posterior wall of the pouch and the anterior wall of the pulled-through colon. Instead, a perineal stump (perineal colostomy) of 3–4 cm of exteriorized colon was left, to avoid any contamination to the peritoneal cavity (Fig. 2). After 3 weeks, this stump was excised under general anesthesia, the posterior wall of the colon was sutured to the anus, and the septum was sectioned using stapler sutures. This procedure obviously includes the complete section of any hypertonic internal anal sphincter.

All of the patients had an uneventful recovery period, without any postoperative complications. After a follow-up period of 2–3 years, patients were noted to be asymptomatic, with daily normal evacuations and without soiling or episodes of enterocolitis. Since the patients had no symptoms and no fecaloma formation, no other imaging studies were performed.

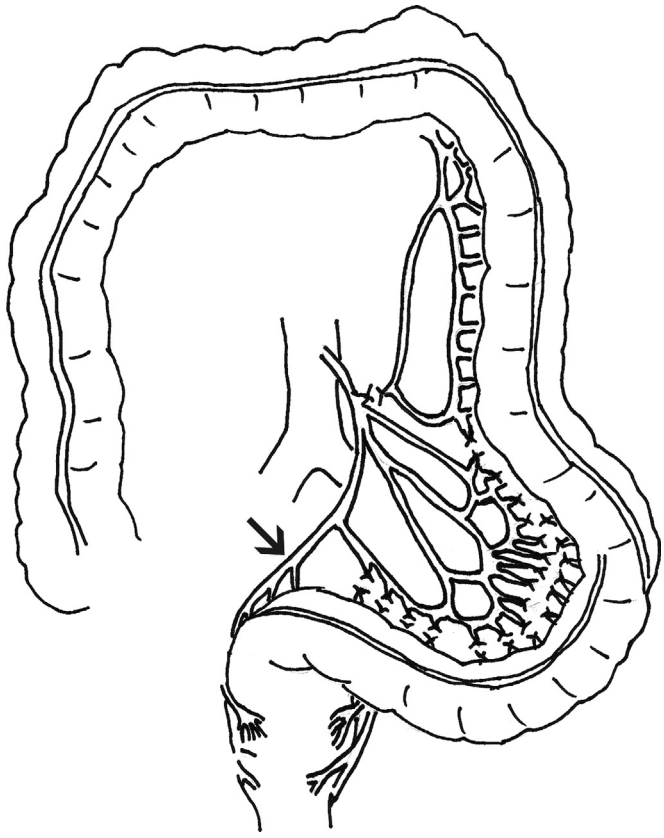

Fig. 1. Schematic drawing showing colon vascularization and vessel ligations close to the colon wall. Note that the trunk of the inferior mesenteric vessels and most distal branch (arrow) are preserved.

2. Discussion

The publication of this study is considered to be justified because scant literature is available on reoperations after TEPT procedure, given that the technique has been utilized only in the last 15 years. The patients presented in this report underwent a redo procedure because of persistent serious problems such as enterocolitis, constipation, fecal incontinence and abdominal distension, although it was reported that these complications may occur in up to 80% of patients after pull-through and may be treated with laxatives and pro-kinetic [8]. However, it is important to stress that in the three patients herein described, a huge colonic dilatation was noted in the contrast enema, with clinical intractability, no body weight gain, and frequent necessity of manual fecaloma remotion under general anesthesia.

The main post-operative complications of TEPT procedure are due to anastomotic strictures, fistulas and incomplete colon resection in cases of pull-through of the transition zone, as shown by some recent revisions [7,10,11]. Diagnosis confirmation using histological analysis of the pulled-through area is always necessary [15]. Incomplete resection can be confirmed by the presence of increased AChE activity or altered histology on hematoxylin eosin examination. Some patients (e.g., cases 1 and 3) may have normal histology but persistent serious symptoms refractive to other clinical measures, thus necessitating reoperation. The surgical

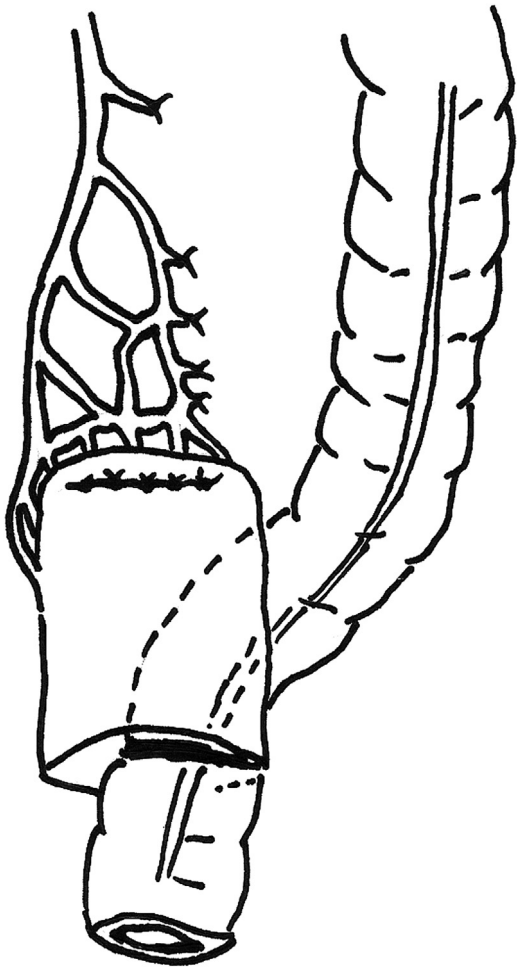

Fig. 2. Final aspect of the closed pouch in the pelvis and the pulled-through colon according to Duhamel technique. Note the perineal stump left as a perineal colostomy.

technique described in this report is, in fact, the transformation of an endoanal procedure into Duhamel's surgery, with the preservation of the distal, previously pulled-through colon through vascularization by the distal branch of the inferior mesenteric vessels. We decided to utilize the Duhamel's surgery because we have a previous great experience in performing this technique [3] and we judge it is more simple, in comparison with other described techniques in cases of repeated pull-through for complicated Hirschsprung's disease [9]. In addition, we are proposing an additional variation of the technique, performing a perineal colostomy and thus avoiding any other stoma in the abdominal wall. In our opinion, this is the simplest type of redo pull-through because no perineal dissection is performed, with minor risks of compromising postoperative fecal continence. The perineal colostomy allows that the pulled-through colon may adhere to the pelvis after a 3-week period, when the perineal stump may be resected, with no risks of dehiscence.

3. Conclusion

This is a new effective and simple technique of redo operation after failed TEPT. It provides a normal fecal continence.

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